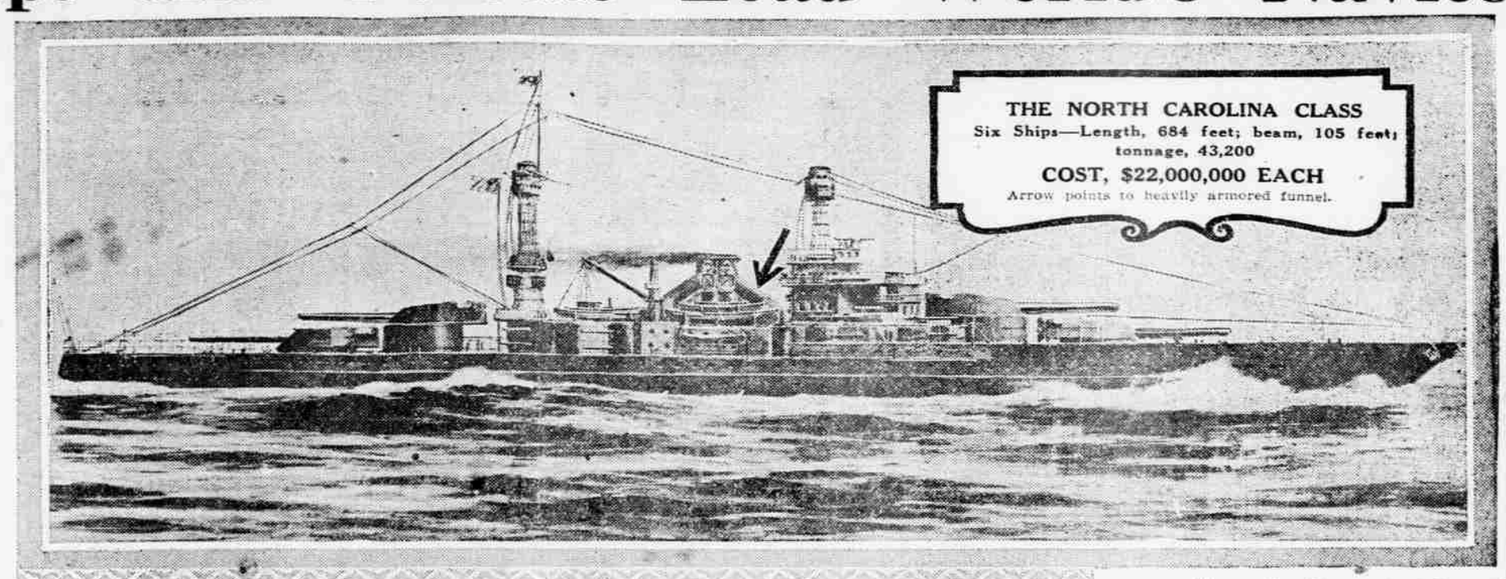
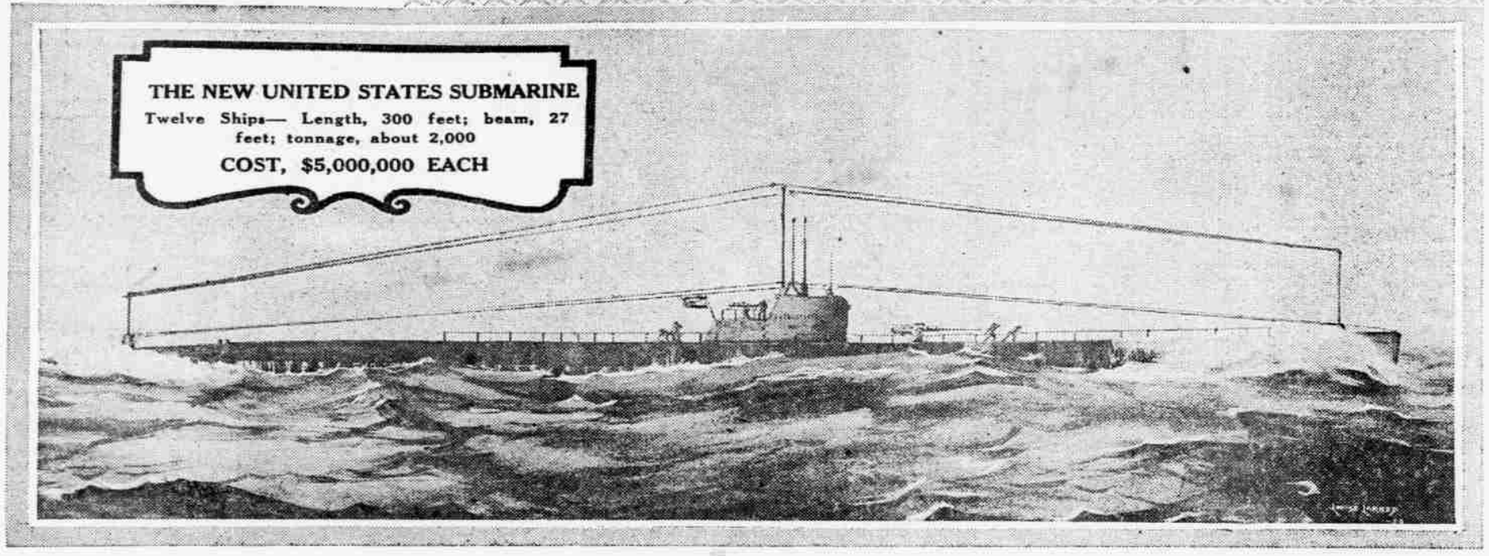
Our New Battleships and T-Boats Lead World's Navies

Vessels of the North Carolina Class When Completed Will Put United States in Advance of Any Nation When Major Fighting Craft Are Considered---Fleet Submarines Under Construction Completely Overshadow Famous Deutschland in Size and Speed, Besides Possessing Latest Marvels in Mechanical Equipment





HEREWITH is another chapter in the series describing the expansion of the United States Navy. Previous chapters have described the forty knot battle cruiser, to cost $23,000,000; the mammoth dirigible R-38, and the remrakable new flying boat, G B-1. A recently published cable article, from our Berlin correspondent, describing a new German invention by means of which submarines of 10,000 tons and capable of supporting armor may be possible. The announcement of this invention has a dirct bearing upon the submarine programmes of the nations. The following article and the accompanying illustration tell just where the United States stands in this respect. The article also makes public the details of six battle ships of the North Carolina class, which are to cost $22,000,000 each.

WASHINGTON, D. C., Saturday.

THE first of the new fleet submarines now building for the United States Navy, which are the biggest, most improved craft of their kind now actually under construction in the world, are called the T type, probably because a use had been found previously for other letters of the alphabet. Three other fleet submarines now building at the Portsmouth Navy Yard and six for which bids are now under consideration will be known as the V-boats.

Though the new vessels contain many novel features of design, the most striking advance with regard to their construction is their speed and great cruising radius. Nearly 100 feet longer than the best types of German U-boats, they are swift enough to keep up with the main body of the fleet, and their huge oil tanks give them a cruising radius equal to that of the most modern battleship. They have a length of 300 feet, a beam of 27 feet and a tonnage of about 2,000 tons (not official). They will carry 100 men.

In speaking of the "most modern battleship," it may fittingly be said that the United States now has under construction six craft which, when completed, will be superior to any ship of their type afloat. They are the six battleships of the North Carolina class, authorized under the building programme of 1916.

Battleship Still the Fleet's Backbone, In Opinion of U. S. Naval Experts

Though Secretary Daniels and his advisers agree that the submarine proved in the world war that it has a field in naval warfare which can be filled by no other character of ship and are convinced that the American Navy cannot afford to be without an adequate number of the most improved types, they still believe that the battleship is the backbone of the fleet.

The battleship North Carolina and her five sister ships will be 684 feet long, 105 feet beam and will have a displacement of 43,200 tons. Her speed will be twenty-three knots an hour and she will have an armament of twelve 16-inch guns and sixteen 6-inch guns. The contract price for the hull and machinery of each of these giant craft will be in the neighborhood of $22,000,000.

When these battleships and the six battle cruisers now under construction are completed, as they are expected to be by 1923, the United States, according to Secretary Daniels, will be the first naval Power of the world in respect to major ships and gun power. In total tonnage and effective fighting ships the United States will be equalled by Great Britain.

The American Navy, however, will be considerably weaker than the British Navy, Secretary Daniels asserts, in light cruisers and other ships used for protecting the main body of the fleet and in conducting blockading operations. We will be slightly inferior in submarines, even when all twelve of the fleet submarines contemplated by the present programme are completed, and the lack of fleet aviation forces will place us at a disadvantage with Great Britain.

Secretary Daniels Points Out Weakness of Our Navy Equipment

"This means," the Secretary has said, "that while our battleship force will be sufficiently powerful to cope with any navy in the world in a main fleet engagement between battleships, yet our main fleet would be open to torpedo attack by the enemy's torpedo forces. We would also be handicapped in obtaining information of the enemy's movements and maintaining the blockade of the enemy's ports. Due to this weakness in ships of this class, we would be handicapped in conducting attacks against the enemy's fleet with torpedoes."

In view of this statement, it is not difficult to understand why naval men are deeply interested in the new fleet submarines.

The following table shows the present strength of the navies of Great Britain and the United States with regard to submarine craft:

	No. of Ships.	Tonnage.
Great Britain.....	98	85,505
United States.....	54	35,361

When submarine craft now authorized or projected are completed the table, including Japan, will read as follows:

	No. of Ships.	Tonnage.
Great Britain.....	117	107,475
United States.....	97	73,461
Japan	10	8,500

New Craft Several Knots Faster Than the Famous Deutschland

When the Deutschland poked her periscope out of the sea off New London after her epoch making voyage across the Atlantic the world looked on with incredulous amazement. Even well informed men found it hard to credit reports of her power and size. The new fleet submarines, however, are not only more than one hundred feet longer and of nearly one thousand tons greater displacement than the Deutschland but are also several knots faster.

The present programme contemplates twelve fleet submarines, three to be known as T-boats and nine as V-boats. The first three are being built by the Electric Boat Company of New York and three of the V-boats are being built by one United States Government at the Portsmouth Navy Yard, work having been started on them early in 1920. Last August bids were opened for the remaining six, and these bids are now under consideration. The ships are expected to cost in the neighborhood of $5,000,000 each.

The designs for all the fleet submarines were prepared by Admiral D. W. Taylor, chief constructor of the navy, who has made a careful study of all existing types of foreign craft.

The propelling machinery for surface operations consists of two main Diesel engines, located in the after part of the hull, driving directly on the main shafts, and two auxiliary engines in the forward part of the boat, driving electric generators, which in turn supply electric current to two main motors, one on each main shaft.

When operating submerged the vessel will be propelled by the two main electric motors, taking current from a powerful storage battery. It is estimated that the surface speed under full power will exceed twenty knots an hour and that nearly half that speed will be attainable in submerged condition. The fuel capacity of the ship is such as to provide for a radius of action of approximately 10,000 miles, the vessel being entirely self-supporting during that time.

Though an American built the first practical submarine and Americans have been foremost in its development, the Diesel engine, which made possible the modern, ocean-going type of submersible, is the invention of a German. The German Navy refused to adopt the submarine so long as there was only gasolene to propel it on the surface. The U-1, forerunner of the long line of U-boats which was the scourge of the seas during the early part of the war, was not launched until 1906, after Dr. Diesel had got his motor into practicable working condition.

The advantages of the Diesel engine over the gasolene motor are that it gives more power, uses a cheaper grade of fuel and is much less dangerous. Three out of every four strokes of the piston of a gasolene motor waste power instead of producing it, while the Diesel is a two cycle engine, gaining power on every second stroke.

Three periscopes of the latest improved pattern will form part of the equipment of the fleet submarines, and each vessel will be provided with the latest type of radio telegraph outfit, both for surface and submerged work. The idea of the periscope dates from the middle of the nineteenth century, when French and Dutch inventors experimented with them. During the civil war, when the monitor Osage had run aground in the Red River, her chief engineer, Thomas Doughty, constructed a periscope from a piece of three inch steam pipe and bits of looking glass, by means of which the warship's commander was able to look over the high banks of the river and repulse an attack by 3,000 Confederates by fire from the monitor's 11 inch guns, directed through the periscope.

So crude was the periscope, however, that as late as 1900 John P. Holland refused to adopt it for his submarines. To the Germans belongs the credit for bringing it to its present efficiency. The three periscopes on the new American undersea boats will enable them to keep a lookout in all directions at once and will also provide "spares" in case one should be damaged.

The first U-boats were equipped with only one periscope, until, after the sinking of the U-15, the Germans began putting more on their vessels. During the early stages of the war the U-15 attacked a British squadron, but revealed herself by the wake of her periscope, and a well aimed shot from the cruiser Birmingham smashed the protruding "eye." The U-15 dived blindly to safety. A few moments later she attempted a quick "porpoise dive" up to the surface and down again in an effort to locate her enemy. This time the Birmingham gave her a broadside and a shell tore a great hole through her deck.

Scope of the Submarine's Work Shows Gain and Is Still Growing

Owing to the comparative recency of the development of the oceangoing submarine, particularly of a type of sufficient speed and cruising radius to accompany the fleet, a system of tactics had not yet been completely worked out. The original function of the submarine was to serve as a "daylight torpedo boat;" that is, to accomplish in broad daylight that which surface torpedo boats were expected to do under cover of darkness, fog or smoke, namely, to creep close to an enemy and launch a torpedo unobserved.

With the development of greater speed, armament and range of action, however, the scope of their operations has been broadened. Owing to their low visibility they are now becoming of utility in night attacks on the surface, though they are useless for under water attack after nightfall because the periscope is practically blind at night.

The increase in the number of torpedo tubes and the greater power of torpedoes carried, together with the larger gun power, has also tended to increase their utility in engagements with surface ships.

The fleet submarines of the United States Navy carry 5-inch guns, which are larger than those ordinarily placed on submarines, though the British navy is said to have a new submarine mounting a 12-inch gun.

New Type of Torpedo Tubes Gives a Distinct Advantage

One decided advantage which the new American craft will have is that her submerged torpedo tubes are not of the type known as "fixed." This means that when one of these craft wishes to fire a torpedo it will not be required to manœuvre the whole craft in order to aim the torpedo tube, as is the case with practically all other submarines.

Special attention is understood to have been given to the problem of making the new submarines as nearly immune as possible to depth bomb explosions. On this subject, however, navy officials are reticent, as the method of attaining this immunity is secret. Thickness of armor, far from protecting the craft from an under water explosion, has just the opposite effect, the armor being driven into the vessel after the manner of a projectile if the explosion is within close proximity.

Another feature to which American designers have paid particular attention is that of habitability. Careful and detailed study was given all types of foreign vessels during the war, and it may be safely said that the fleet submarines will be more comfortable for their crews than any other submarines in the world. The emphasis laid by navy officials upon this point is due to the belief that efficiency of the average submarine has in the past been very greatly impaired by living conditions which the average layman would consider unbearable. In this connection it may be stated that the world over American sailors have the reputation of being well housed.

Submarines Under Construction By All the First Class Powers

Much has been said in condemnation of the submarine, particularly since its employment by Germany in a ruthless submarine warfare. It is a significant fact, however, that all first class Powers are building submarines. Secretary Daniels has made clear his attitude in the following statement:

"No nation, if it is to be prepared to engage in warfare upon the sea, can afford to neglect the submarine or to spare any pains to develop it to meet its needs. This type has come to stay as a factor in naval warfare unless outlawed by international agreement. Its abuse by the Germans in their ruthless campaign should not blind us to the fact that there is a large field for its legitimate use. Without accepting the theory of the enthusiasts that submarines alone can be developed to meet adequately all needs of naval warfare, we must all agree that the submarine cannot be ignored and has a field of its own in the conduct of war upon the sea which cannot be filled by any other character of ship."

British Experts Clash Over Types of War Craft

Vice-Admiral Sir Percy Scott Holds War Proved Superiority of Submarines---Older Officers Firm for Major Ships

Washington, D. C. Saturday.

IN view of the American decision to proceed with a giant naval building programme, based on capital ships, the controversy now raging in England over the British naval policy is of intense interest. It instantly raises the question of whether those responsible for the United States programme, involving a total of $675,515,731, a large part of which is to go for construction, are right in their determination of what type of war vessels are required to keep the American Navy in the foreground with the other nations of the world.

The dispute in England is over the question of whether it is better to build capital ships, such as dreadnoughts and battle cruisers, or smaller craft, like submarines and submarine chasers.

The clash has assumed tremendous proportions, so great, in fact, that the Admiralty programme for the construction of large fighting vessels has been set aside until a complete survey can be accomplished. The investigation is to be conducted, according to the information in Washington, by the British Committee of Imperial Defence.

United States and Japan Going Ahead With Construction of Capital Ships

Meantime the United States and Japan are going ahead on the theory that capital ships, as they always have been, will continue to be the dominating force in naval warfare. Both nations are going ahead with large building programmes, with the result that the British fear their fleet soon will rank third among the navies of the world. It is to retain their pre-war policy of maintaining the most powerful navy afloat that the British are so keenly concerned about the type of vessel that should be built.

Vice-Admiral Sir Percy Scott, of the British Navy, the originator of modern naval gunnery, first raised the cry against the battleship when the British Admiralty announced its programme of battleship construction. He based his objections to the construction of large fighting craft on the record of the war, in which submarines, not battleships, predominated in the action.

"In the war we kept our battleships for four years in port," Sir Percy argued, "and the Germans kept their battleships for four years in the Kiel canal. When they were taken out they had to be guarded with whole flotillas of destroyers and treated as if they were made of glass.

"Other Powers may be building battleships. They may also be making a mistake in so doing. That is no business of ours. But if there is a risk that they are mistaken, the Admiralty ought to explain very clearly what use it has for the battleships before we build them. It ought to tell us what they are for.

"If we are going to build battleships at the cost of £8,000,000 [$30,000,000] to £9,000,000 [$33,750,000 present exchange] apiece, we shall have to build nurses for them in the shape of destroyers and we shall have to provide safe harbors, in which to keep them. For if we do not they will not be on the surface very long if there are any submarines about."

Think Submarines Instead of Battleships Would Have Won the War for Germany

In order to reenforce the arguments against the battleship Sir Percy brought to light an incident of 1913—a blunder, he calls it—which he believes prevented Germany from winning the war. He recommended in 1913 a British navy programme for the building of submarines and airplanes, instead of two battleships, but the Admiralty overruled. In consequence, he added, Germany built battleships, which were not used, rather than submarines and airplanes, which Germany hastened to construct after the war began. It put Germany behind so much, he said, that she was unable to win the war, although she came near to doing it.

"You must admit," Sir Percy said, "that in the war we [England] were nearly forced to submission by starvation.

"You must admit that the German battleship played no part in reducing us to a state of starvation.

"You must admit that if our battleship superiority had been double what it was they could not have protected us from starvation.

"You must admit that the dominant arm of the war was the submarine. You must admit that our belief before the war that the submarine was only a toy resulted in our coming to the brink of losing the war."

Bases Opposition to Capital Ships On Air Craft as Well as Submarines

Sir Percy's attack on the capital ship is based not only on the submarine, but upon aircraft, and he defies anybody to cite a vessel that can resist attack from the skies. His arguments have attracted much applause among British navy officers who approve of his condemnation of the capital ship.

"The capital ship ought not to be condemned merely because of submarines," John Leyland declared in approving Sir Percy's position. "There remains the question of attack from the air.

"On investigating this matter the United States Navy has an advantage over our own. Its flying service has not been divorced from it. American flying craft are agencies of the fleet. They work in close cooperation and have operated and experimented together. Yet capital ships are being built for the United States Navy of the most formidable character, without any apprehension of destruction from the air.

"In this country, where aircraft are under separate control, coordinated work may not be so easy or so effective. Nevertheless, it is incredible that the Admiralty will propose the building of capital ships if serious danger from the air is to be apprehended."

Older British Navy Officers Stand Firm for the Battleship

The stand against the battleship has attracted innumerable supporters high in the British naval service, but the large surface craft has its defenders, too, in large numbers. In this group are some of the older naval officers, who take the position that the obstacles presented by the submarine have or will be overcome, and that the battleship will remain dominant because of its intense mobility and capability of carrying heavy guns.

The battleship, too, they insist, is the mainstay of the navy when it comes to defensive warfare, although it is admitted that the submarine has many advantages when it comes to offensive operations.

Admiral Sturdee, of the British Navy, insists that the British must continue the programme of surface craft in order to protect the trade routes. He insists that there never was a time during the war that the Grand Fleet was prevented from going to sea because of the German submarines. He said that if all the nations of the world did away with capital ships and had only submarines, the question would get back to where it started.

Submarines, he said, would find it impossible to fight each other and, further, would be of no accouut in defensive warfare. The result would be that the merchant vessels would be armed against the submarines. Then it would be found advisable to have other craft to protect the merchantmen. The result would be submarine destroyers, which would lead to super-destroyers. To meet the super-destroyers, it would be found advisable to have cruisers, which could best be combated by battleships.

T. B. Abell, professor in the School of Naval Architecture, at the University of Liverpool, is a stanch defender of the battleship.

"Until this war," he says, "the torpedo was never a proved weapon. Ships can be built to resist this by no means effectively directed weapon."

Rear Admiral Sir S. Eardley-Wilmot of the British Navy said that the success of the submarine in the late war was due almost entirely to the fact that nothing had been perfected to resist the torpedo, but he explained that as each new development in naval warfare had come it had been resisted by one means or another. He believed, he added, that the means had been found for resisting submarine attack, and that the battleship still was dominant as a naval unit.

Expects Means Will Be Found To Render Submarines Ineffective

That all of England is concerned over the outcome of the controversy is apparent from editorial comments of the London *Times* and other newspapers, which are devoting columns to the discussion.

"The most important subject now before the country is the question of the naval construction policy of the Admiralty," the London *Times* said recently. "An invincible navy is the very life of the nation. Yet within a very few years the British fleet, so far as capital ships are concerned, will be third instead of first among the navies of the world.

"When all allowance has been made for the fact that the two nations (the United States and Japan) to whom we shall, in this respect, yield pride of place are our friends, and in all human probability will remain our friends, this is a serious position . . . . For ourselves, we express no opinion either against or in favor of capital ships. . . . There is no need for the Government to be hustled into precipitate action which may prove to be fatally mistaken. But there is every reason why they should, without delay, take steps to probe the question far more deeply than, to judge from all the available evidence, they have so far thought of doing. For the life of the country is at stake."

Economy in the Government is, of course, one of the considerations. With capital ships costing from $30,000,000 to $40,000,000, the British want to be sure that the vessels they build have some chance of staying afloat in the event of a war. The British Government, after four years of war, is extremely hard pressed for money and rigid saving is a watchword hammered upon continually by Lloyd George and others of the Government in speeches in Parliament.

In sharp contrast with this policy of caution on the part of the British is that of the United States, which, with a fleet in being of 979 vessels, has 165 under construction at the present time. The vessels under construction are eleven battleships, six battle cruisers, ten second class cruisers, one third class cruiser, seventy destroyers, fifty submarines, two gunboats, four tugs and mine sweepers and eleven auxiliaries.

On top of this Secretary Daniels proposes now the building of eighty-eight more vessels of capital class.